jlant-usgs

COLLABORATING ON SOFTWARE PROJECTS

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It’s not “publish or perish” anymore, it’s “share and thrive”.

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FEATURE ARTICLE

POINT OF VIEW

How open science helps researchers succeed

Abstract Open access, open data, open source and other open scholarship practices are growing in popularity and necessity. However, widespread adoption of these practices has not yet been achieved. One reason is that researchers are uncertain about how sharing their work will affect their careers. We review literature demonstrating that open research is associated with increases in citations, media attention, potential collaborators, job opportunities and funding opportunities. These findings are evidence that open research practices bring significant benefits to researchers relative to more traditional closed practices.

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Introduction

Recognition and adoption of open research practices is growing, including new policies that increase public access to the academic literature (open access; ***Björk et al., 2014***; ***Swan et al., 2015***) and encourage sharing of data (open data; ***Heimstädt et al., 2014***; ***Michener, 2015***; ***Stodden et al., 2013***), and code (open source; ***Stodden et al., 2013***; ***Shamir et al., 2013***). Such policies are often motivated by ethical, moral or utilitarian arguments (***Suber, 2012***; ***Willinsky, 2006***), such as the right of taxpayers to access literature arising from publicly-funded research (***Suber, 2003***), or the importance of public software and data deposition for reproducibility (***Poline et al., 2012***; ***Stodden, 2011***; ***Ince et al., 2012***). Meritorious as such arguments may be, however, they do not address the practical barriers involved in changing researchers' behavior, such as the common perception that open practices could present a risk to career advancement. In the present article, we address such concerns and suggest that the benefits of open practices outweigh the potential costs.

We take a researcher-centric approach in outlining the benefits of open research practices. Researchers can use open practices to their advantage to gain more citations, media attention, potential collaborators, job opportunities and funding opportunities. We address common myths about open research, such as concerns about the rigor of peer review at open access journals, risks to funding and career advancement, and forfeiture of author rights. We recognize the current pressures on researchers, and offer advice on how to practice open science within the existing framework of academic evaluations and incentives. We discuss these issues with regard to four areas – publishing, funding, resource management and sharing, and career advancement – and conclude with a discussion of open questions.

Publishing

Open publications get more citations

There is evidence that publishing openly is associated with higher citation rates (***Hitchcock, 2016***). For example, Eysenbach reported that articles published in the *Proceedings of the National Academy of Sciences* (*PNAS*) under their open access (OA) option were twice as likely to be cited within 4–10 months and nearly three times as likely to be cited 10–16 months after publication than non-OA articles published

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The Challenge

- Learning proper software collaboration models and workflows.
- Implementing proper software collaboration models and workflows.

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Software Tool Suite

GitLab

Atlassian
Bitbucket

Collaborative Development Models

Fork and Pull

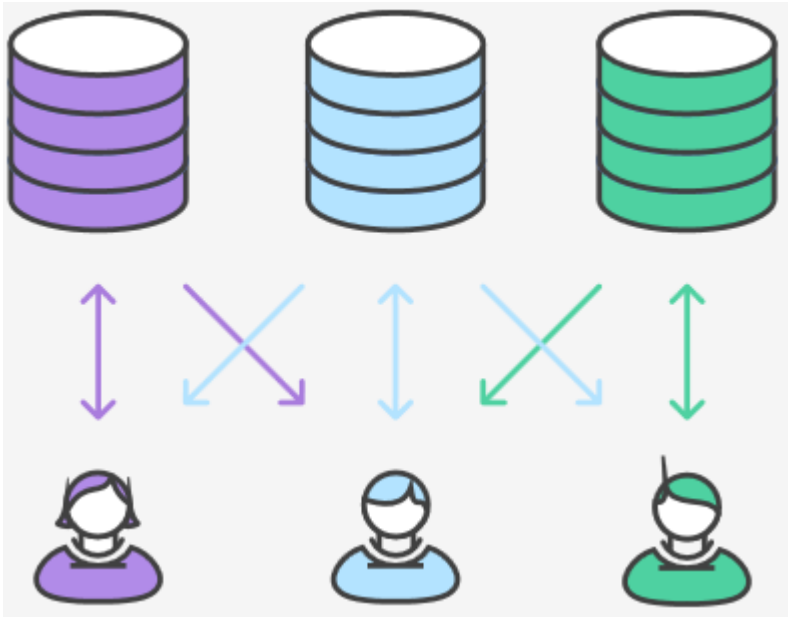
- Collaborators *fork* an existing repository and work on his/her own fork of the source repository.
- Collaborators do not need access to the source repository.
- Collaborators contribute to the source repository via *pull requests*.
- The project maintainer of the source repository reviews *pull requests* from collaborators and can *pull (merge)* the changes into the source repository.
- Popular with open source projects because it reduces the amount of friction for new contributors and allows people to work independently without upfront coordination.
- Distributed

Shared repository

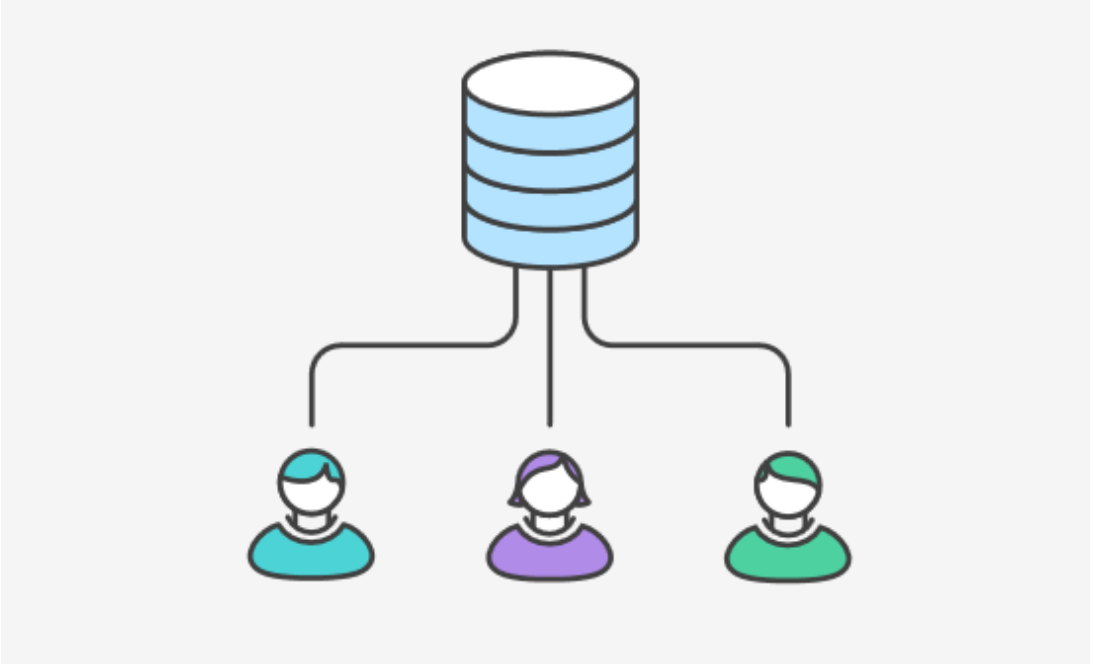
- Collaborators are granted access to *push* to a single shared repository
- Collaborators have common access to a blessed repository where all the developers can *push* too.
- Collaborators must agree on the branch and merge convention.
- *Pull requests* initiate code review and general discussion about a set of changes before the changes are merged into the main development branch.
- Popular with small teams and organizations collaborating on private projects.
- Centralized

Collaborative Development Models

Fork and Pull



Shared repository



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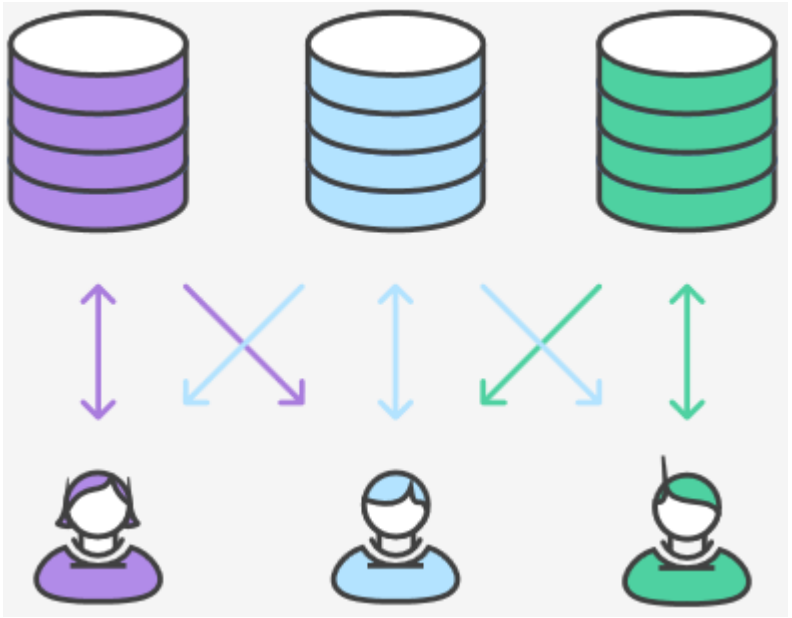
Fork and Pull



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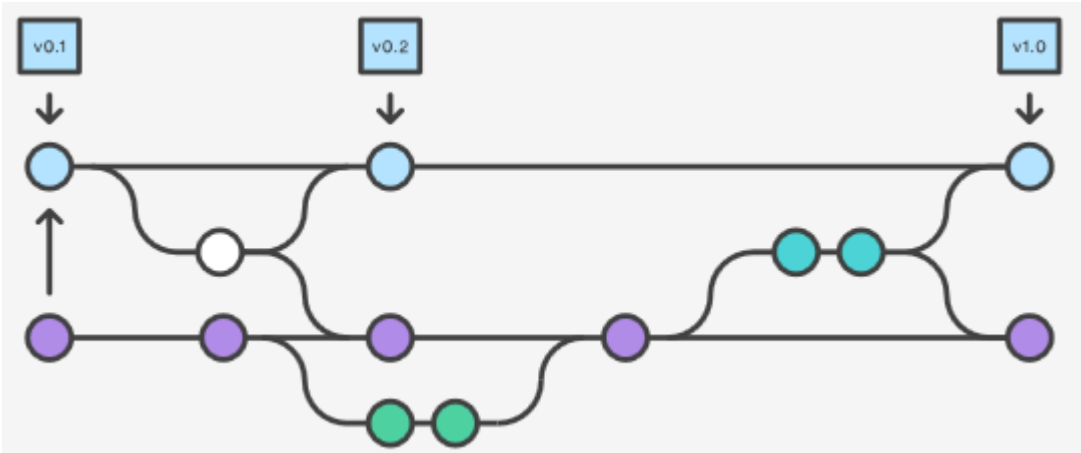

Gitflow Workflow

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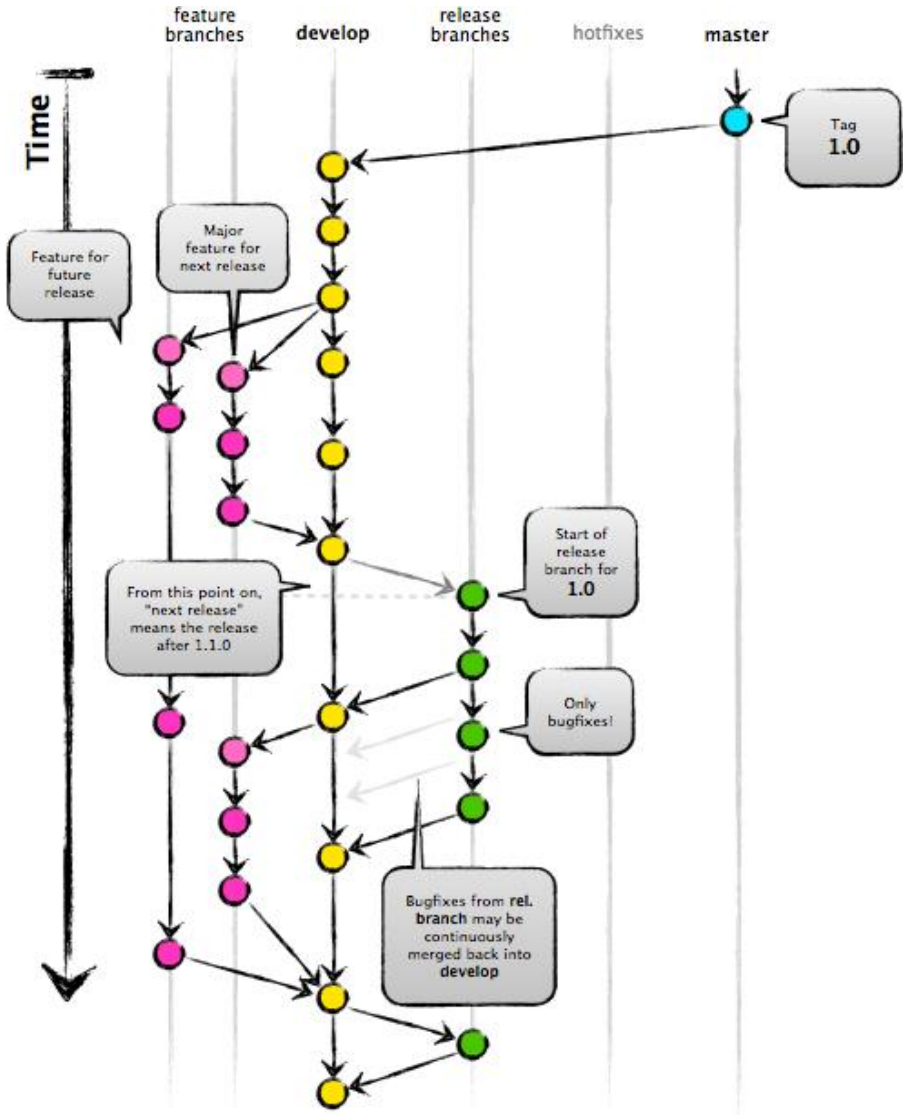

Questions?

- What collaborative development models and workflows are scientist's using for software development?
  - *Fork and pull model*
  - *Shared repository model*
  - Other models?
- How are these models and workflows implemented in practice?
- How are scientist's informing/teaching other fellow scientist's about what works?